1973

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SEASONAL OUTLOOK

TABLE 1

Forecast Trends For Ports

*Escorted**

Ports	*Normal*	*Predicted Trend*	
Itivdleq	*18 April*	*Later*	*(5 to 9 days)*
Sondre Stromfjord	*30 May*	*Later*	*(2 to 5 days)*
Goose Bay	*7 June*	*Later*	*(10 to 15 days)*
Thule	*12 July*	*Normal*	*(± 4 days)*
Kulusuk	*14 July*	*Normal*	*(± 4 days)*

**Concentration in approaches 6/8 or less and fast ice, if any, in part well weakened.*

*Unescorted***

Ports	*Normal*	*Predicted Trend*	
Itivdleq	*7 May*	*Normal*	*(± 4 days)*
Sondre Stromfjord	*8 June*	*Later*	*(6 to 10 days)*
Goose Bay	*25 June*	*Later*	*(16 to 21 days)*
Thule	*25 July*	*Later*	*(5 to 9 days)*
Kulusuk	*18 August*	*Normal*	*(± 4 days)*

***Concentration in approaches and port 1/8 or less.*

EASTERN ARCTIC ICE

18430

Pam: 551.326: (#624) USNOO 1973

POLAR PAM 2020
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I. INTRODUCTION

This seasonal ice outlook presents a written and graphic description of expected ice conditions in the eastern Arctic between mid-May and mid-August. The outlook supports Military Sealift Command (MSC) arctic operations. Prognostic ice charts with envelopes showing maximum and minimum ice edges for each midmonth period are included, along with selected environmental charts used for this outlook. Forecast trends for ports of major interest in the MSC resupply operations are given in table 1 (on the cover).

II. PRELIMINARY SURVEY OF ICE CONDITIONS, MARCH 1973

Initial aerial reconnaissance was conducted in Baffin Bay, Davis Strait, and the Labrador Sea between 16 and 21 March. NOAA-2 satellite SR images and VHRR photographs between 22 and 25 March were used to supplement aircraft data along the southeastern Labrador and the Newfoundland coastal areas. This satellite also provided all the ice information for the east Greenland coast. Aerial reconnaissance and satellite information are shown in figure 1. Ice concentrations along the Labrador and Newfoundland coasts were heavier than normal but less than observed in 1972. Ice concentrations were generally 7 to 8 oktas, except for 3 to 7 oktas along the ice edge and a small ice-free to 3-okta area in the approaches to Hamilton Inlet. Between 57°W and 60°W in the Belle Isle Strait primarily 6 to 8 oktas were observed except for some ice-free to 3-okta areas developing along the coasts.

From 60°N to 67°N ice concentrations observed within the pack consisted of 5 to 8 oktas predominantly medium and thin first-year ice. Some second-year ice was observed in the vicinity of Cape Dyer. The ice edge extended eastward to 55°W similar to last year and intersected the west Greenland coast at 66°25'N.

The ice in central and eastern Baffin Bay appeared to be slightly thinner than normal, similar to last year. Concentrations consisted entirely of compact pack ice with predominantly medium first-year stage of development. Approximately 30 percent of the ice concentrations in Baffin Bay were 8 oktas with no openings; "water between floes" was reported in the remainder of the pack. Light to moderate ridging consisted primarily of weathered and new ridges. Many small and medium floes were reported in this area.

The North Water area observed this year was less extensive than last year. Except for compact pack of predominantly gray-white and gray ice between 77°30'N and 78°45'N east of 75°30'W, the North Water area was poorly defined.

Satellite data indicated a narrow band of pack ice along the east Greenland coast south of 64°30'N. From 64°30'N to a point east of Jan Mayen Island at 71°N the pack widened to 280 miles. Concentrations were predominantly 7 to 8 oktas, except for several 15- to 40-mile-wide areas of 4 to 7 oktas adjacent to the ice edge between 60°N and 70°N. In addition, an extensive area of 4 to 7 oktas was observed north of 70°N east of 10°W.

III. OUTLOOK

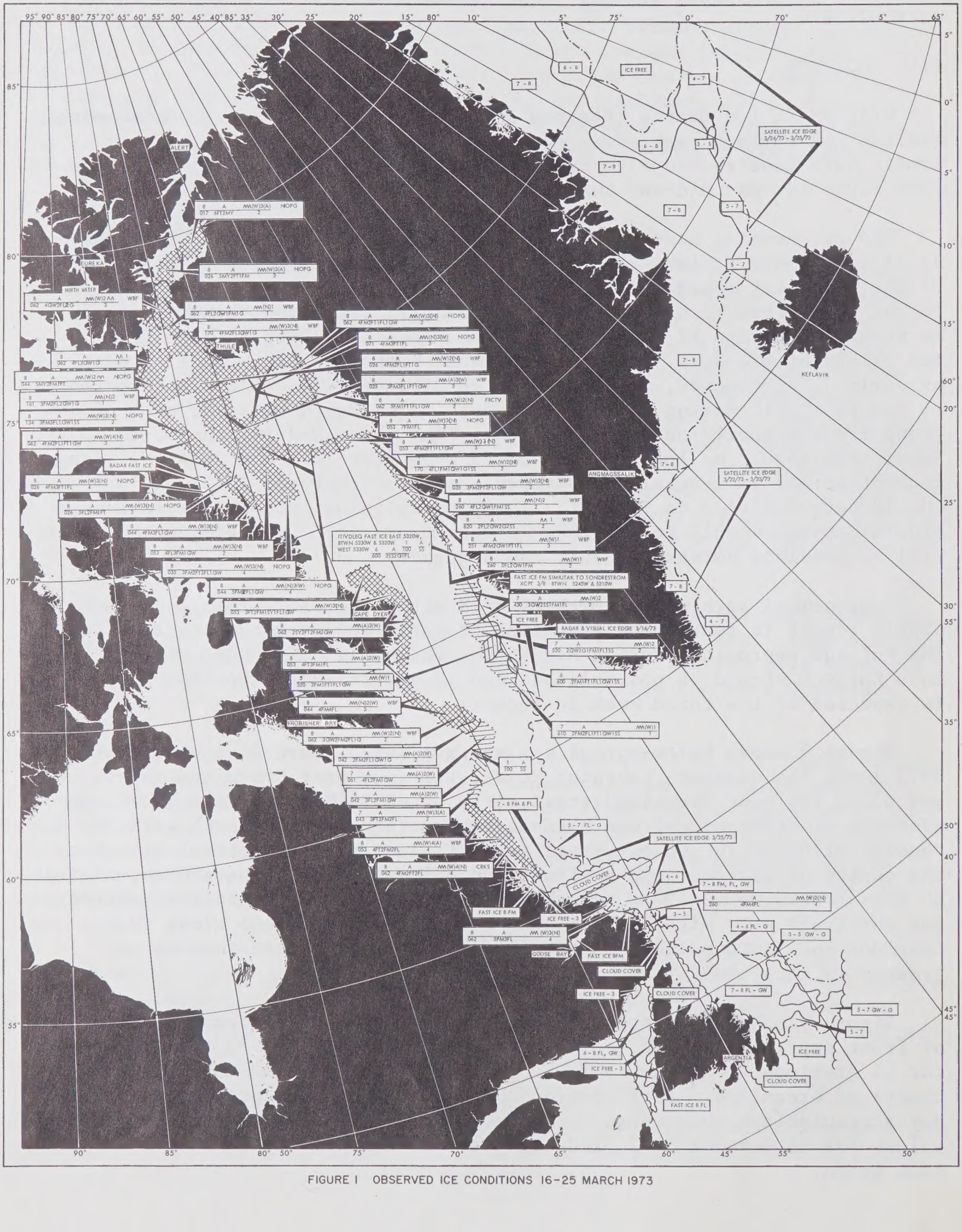
Prognostic ice charts (figures 2 through 5) contain envelopes showing minimum and maximum pack edges for mid-May through mid-August. These limits were constructed with data from 1953 through 1972. The predicted pack edges for the mid-May through mid-August period are also shown.

The prognostic, mean sea-level atmospheric chart for the period mid-April to mid-May indicates onshore drift along the Labrador coast north of the Goose Bay approaches. Therefore, very open pack ice should remain in the approaches to Goose Bay until mid-July. Escorted shipping should be possible between 17 and 22 June with unescorted shipping into Goose Bay likely by mid-July. Fast ice in Thule harbor should be well broken by early July; however, variable wind conditions will cause 2 to 5 oktas of ice to remain during most of the month. The North Water or area of young ice was poorly defined in March. Thus, by mid-July, the North Water area should be located west of 72°W between 73°N and 78°45'N. Ice concentrations in central and western Baffin Bay between 70°N and 75°N should decrease to 3 to 7 oktas. Escorted shipping into Thule via the Middle Passage should be possible between 8 and 16 July. Unescorted entry will be possible between 30 July and 4 August.

Near-normal pack width north of 66°N along the east Greenland coast should result in continuous advection of variable ice concentrations into the Kulusuk approaches during May, June, and early July. Escorted entry into Kulusuk should be possible between 10 and 18 July. Unescorted entry is expected by the third week in August.

Figure 7 shows below-normal sea surface temperature during February 1973 along the southern Labrador coast, the southwest Greenland coast, and along the east Greenland coast north of 63°30'N. Figure 8 shows persistence of below-normal sea surface temperatures during March with intensification of the below-normal trend in some areas, particularly along the coasts of Labrador and Newfoundland. These lower temperatures, similar to those observed in 1972, and the scarcity of warm water in the Labrador Sea correlate well with heavier-than-normal ice conditions along the Labrador and Newfoundland coasts and will result in later-than-normal breakup in this area.

Figure 9 compares historical minimum, normal, and maximum accumulations of frost degree days with those observed during the 1972-73 growth season for 11 stations along the Labrador coast and along the east and west coasts of Greenland. Four stations have experienced record frost degree day accumulations this season. Maximum, normal, and current ice thickness values for 15 October 1972, 1 January, and 15 March 1973 are also shown on each graph.


ALERT
EUREKA
NORTH WATER
THULE
RADAR FAST ICE
CAPE DYER
FROBISHER BAY
GOOSE BAY
ARGENTIA
ANGMAGSSALIK
KEFLAVIK
8 A ʌʌʌ(W)3(A) NOPG 017 6FT2MY 2
8 A ʌʌʌ(W)3(A) NOPG 026 3MY2FT1FM 3
8 A ʌʌʌ(W)2 ʌʌ WBF 062 4GW2FL2G 3
8 A ʌʌʌ(N)1 WBF 062 4FL2GW1FM1G 1
8 A ʌʌʌ(W)3(N) WBF 170 4FM2FL1GW1G 3
8 A ʌʌ 1 062 4FL3GW1G 1
8 A ʌʌʌ(W)2 ∩∩ NOPG 044 3MY2FM1FT 3
8 A ʌʌʌ(N)2 WBF 161 3FM2FL2GW1G 1
8 A ʌʌʌ(W)3(N) NOPG 134 3FM3FL1GW1SS 2
8 A ʌʌʌ(W)4(N) WBF 062 4FM2FL1FT1GW 3
8 A ʌʌʌ(W)3(N) NOPG 026 4FM3FT1FL 4
8 A ʌʌʌ(W)3(N) NOPG 026 3FL2FM1FT 3
8 A ʌʌʌ(W)3(N) WBF 044 4FM3FL1GW 4
8 A ʌʌʌ(W)3(N) WBF 053 4FL3FM1GW 2
8 A ʌʌʌ(W)3(N) NOPG 035 3FM2FT2FL1GW 4
8 A ʌʌʌ(N)3(W) NOPG 044 5FM2FL1GW 4
8 A ʌʌʌ(W)3(N) 053 3FT2FM1SY1FL1GW 4
8 A ʌʌʌ(A)3(W) 062 2SY2FT2FM2GW 2
8 A ʌʌʌ(A)2(W) 053 4FT3FM1FL 3
5 A ʌʌʌ(W)1 320 2FM1FT1FL1GW 1
8 A ʌʌʌ(N)2(W) WBF 044 4FM4FL 3
8 A ʌʌʌ(W)2(N) WBF 062 3GW2FM2FL1G 2
6 A ʌʌʌ(A)2(W) 042 2FM2FL1GW1G 2
7 A ʌʌʌ(A)2(W) 061 4FL2FM1GW 2
6 A ʌʌʌ(A)2(W) 042 3FL2FM1GW 2
7 A ʌʌʌ(W)3(A) 043 3FT2FM2FL 2
8 A ʌʌʌ(W)4(A) WBF 053 4FT2FM2FL 4
8 A ʌʌʌ(W)4(N) CRKS 062 4FM2FT2FL 4
8 A ʌʌʌ(W)3(N) NOPG 062 4FM2FT1FL1GW 2
8 A ʌʌʌ(N)3(W) NOPG 071 4FM3FT1FL 3
8 A ʌʌʌ(W)2(N) WBF 026 4FM2FL1FT1G 3
8 A ʌʌʌ(A)3(W) WBF 035 3FM3FL1FT1GW 3
8 A ʌʌʌ(W)2(N) FRCTV 062 5FM1FT1FL1GW 2
8 A ʌʌʌ(W)3(N) NOPG 053 7FM1FL 3
8 A ʌʌʌ(W) 3 (N) WBF 053 4FM2FT1FL1GW 3
8 A ʌʌʌ(W)2(N) WBF 170 4FL1FM1GW1G1SS 2
8 A ʌʌʌ(W)3(N) WBF 035 3FM2FT2FL1GW 2
8 A ʌʌʌ(N)2 WBF 260 4FL2GW1FM1SS 2
8 A ʌʌ 1 WBF 620 2FL2GW2G2SS 2
8 A ʌʌʌ(W)1 WBF 251 4FM2GW1FT1FL 3
8 A ʌʌʌ(W)1 WBF 260 5FL2GW1FM 2
ITIVDLEQ FAST ICE EAST 5320W, BTWN 5330W & 5320W 1 A 100 SS, WEST 5330W 6 A 600 3SS2G1FL
FAST ICE FM SIMIUTAK TO SONDRESTROM XCPT 3/8 BTWN 5245W & 5210W
7 A ʌʌʌ(W)2 430 3GW2SS1FM1FL 2
ICE FREE
RADAR & VISUAL ICE EDGE 3/16/73
7 A ʌʌʌ(W)2 520 2GW2G1FM1FL1SS 2
6 A 600 2FM1FT1FL1GW1SS
7 A ʌʌʌ(W)1 610 2FM2FL1FT1GW1SS 1
1 A 100 SS
7 - 8 FM & FL
5 - 7 FL - G
SATELLITE ICE EDGE 3/25/73
CLOUD COVER
4 - 6
7 - 8 FM, FL, GW
8 A ʌʌʌ(W)2(N) 260 4FM4FL 4
3 - 5
FAST ICE 8 FM
ICE FREE - 3
8 A ʌʌʌ(W)3(N) 062 5FM3FL 4
FAST ICE 8FM
CLOUD COVER
4 - 6 FL - G
3 - 5 GW - G
ICE FREE - 3
CLOUD COVER
7 - 8 FL - GW
5 - 7 GW - G
5 - 7
ICE FREE
6 - 8 FL, GW
ICE FREE - 3
CLOUD COVER
FAST ICE 8 FL
6 - 8
ICE FREE
7 - 8
4 - 7
SATELLITE ICE EDGE 3/24/73 - 3/25/73
6 - 8
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SATELLITE ICE EDGE 3/22/73 - 3/23/73
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95° 90° 85° 80° 75° 70° 65° 60° 55° 50° 45° 40° 85° 35° 30° 25° 20° 15° 80° 10° 5° 75° 0° 70° 5° 65°
85° 80° 75° 70° 65° 60° 55°
5° 0° 5° 10° 15° 60° 20° 25° 30° 55° 35° 50° 40° 45° 45°
90° 85° 80° 50° 75° 70° 65° 60° 45° 55° 50°

FIGURE I OBSERVED ICE CONDITIONS 16-25 MARCH 1973

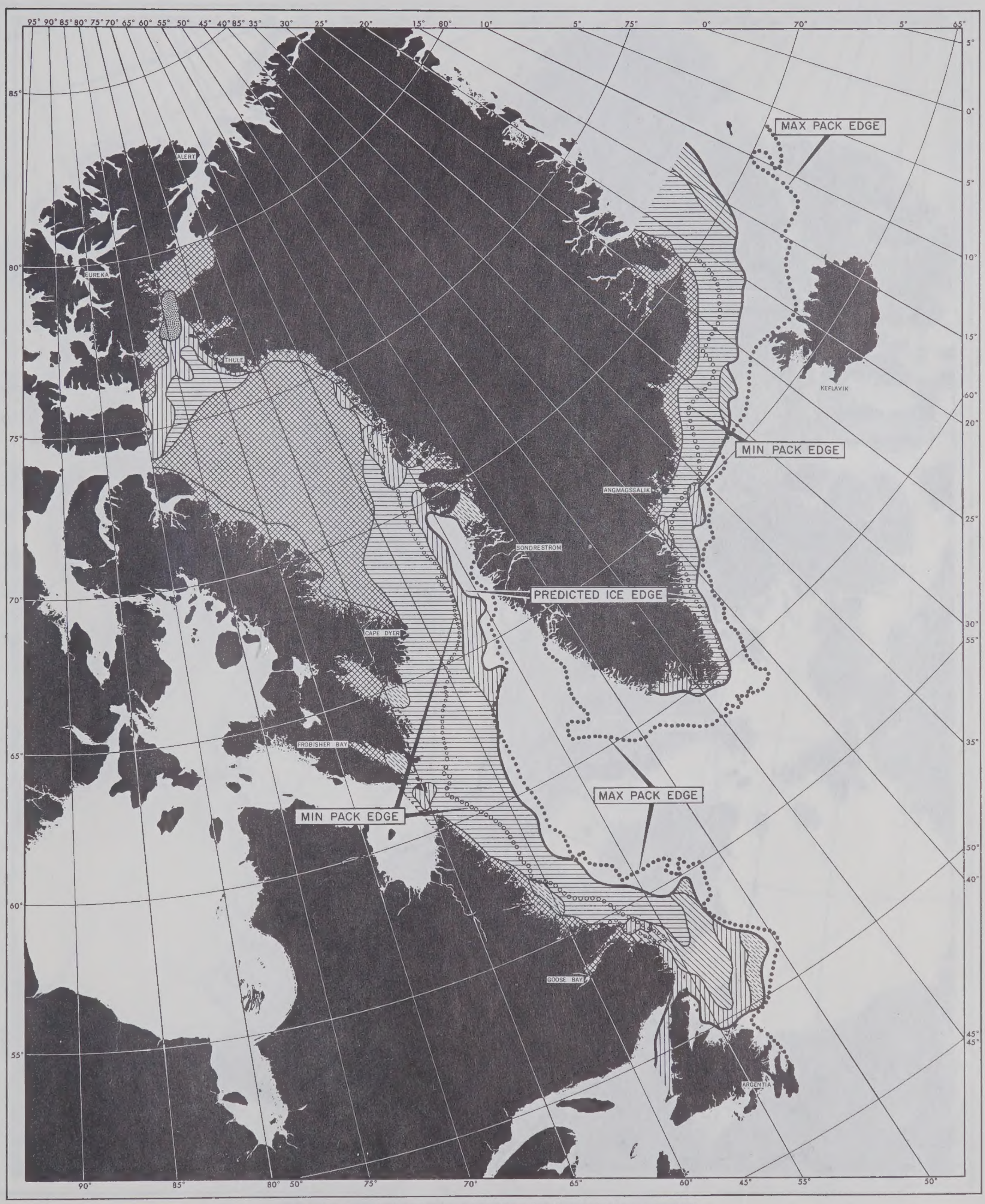


FIGURE 2 ENVELOPE AND PROGNOSTIC ICE CHART MID-MAY 1973

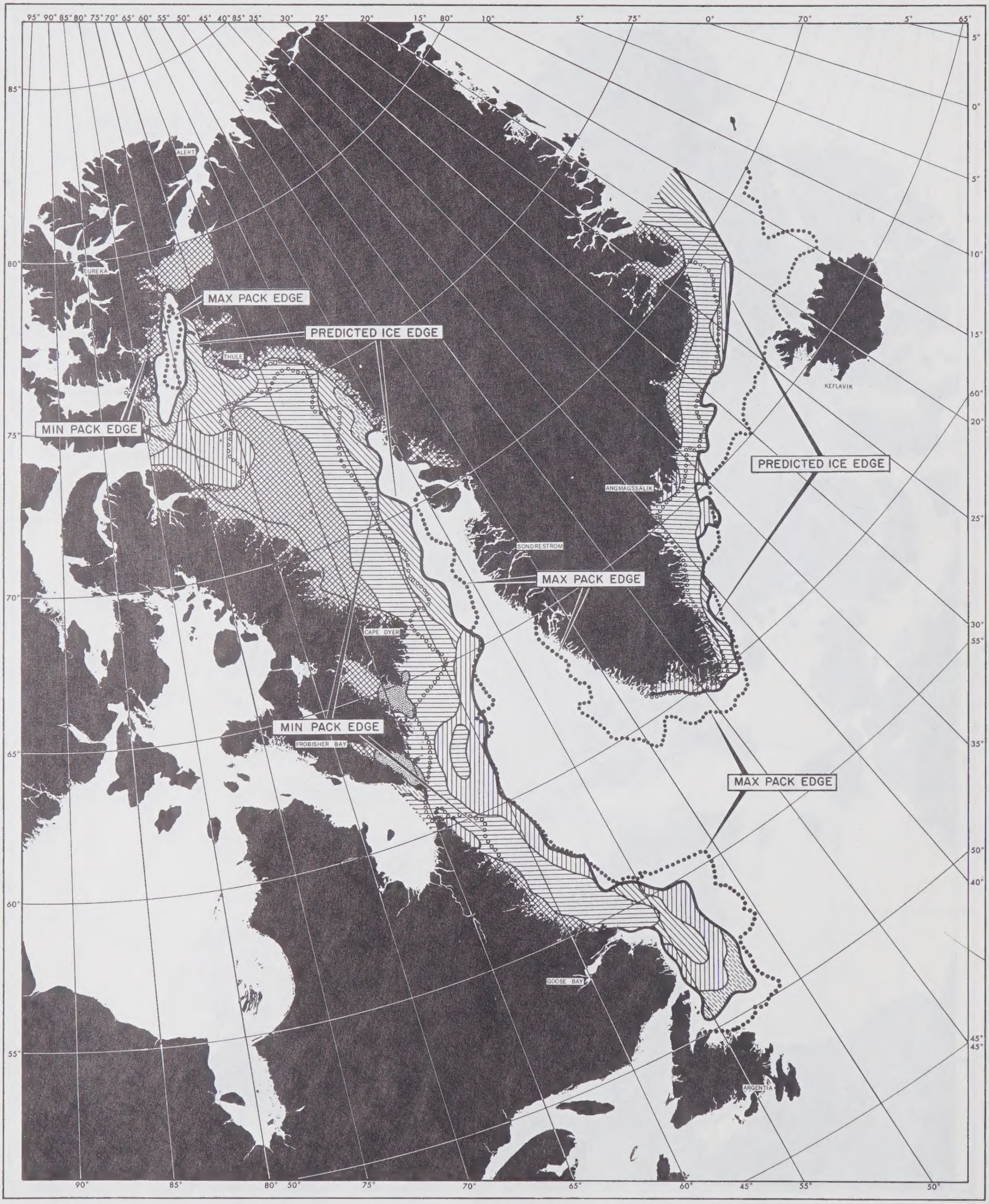


FIGURE 3 ENVELOPE AND PROGNOSTIC ICE CHART MID-JUNE 1973

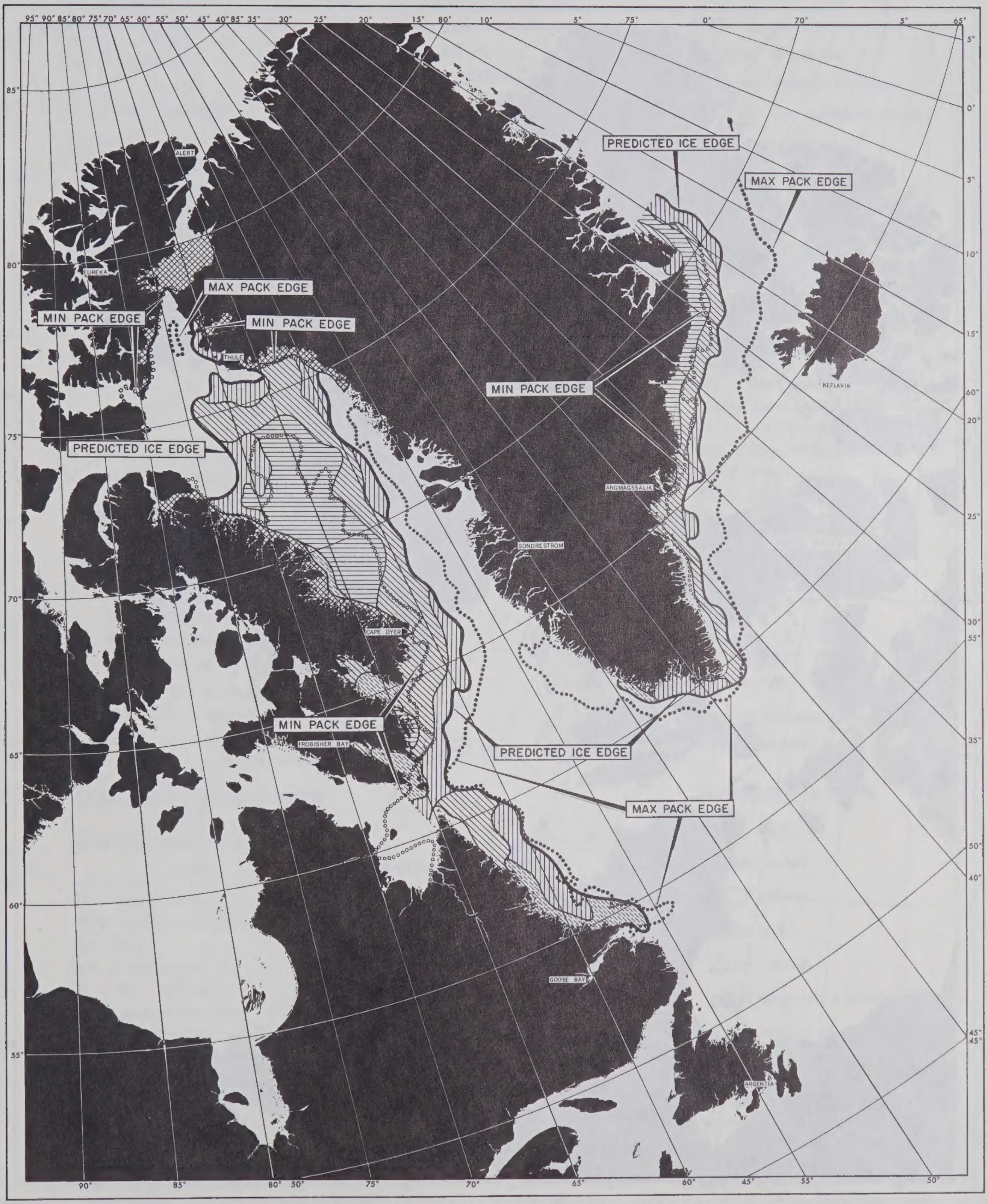


FIGURE 4 ENVELOPE AND PROGNOSTIC ICE CHART MID-JULY 1973

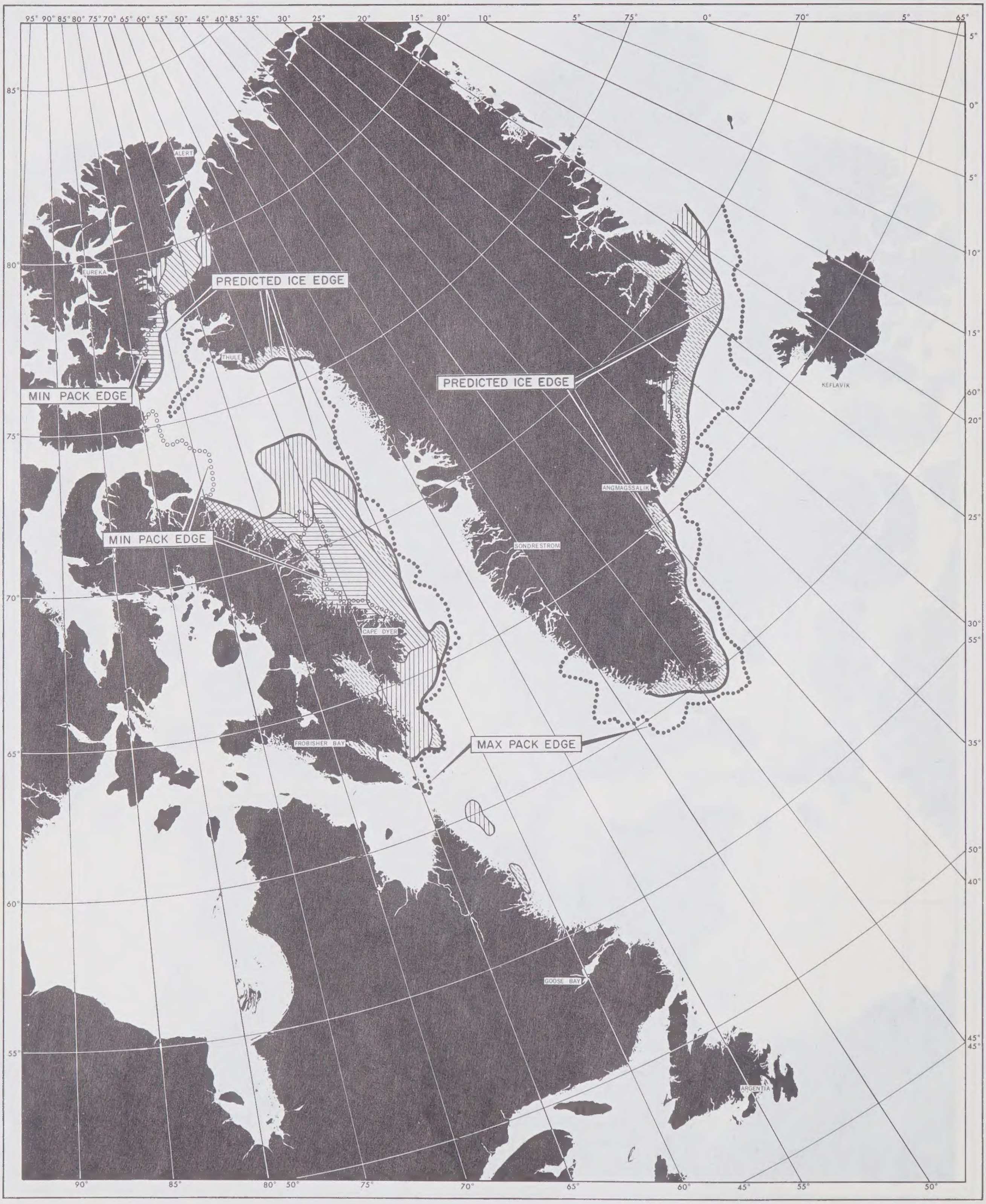


FIGURE 5 ENVELOPE AND PROGNOSTIC ICE CHART MID-AUGUST 1973

KEY TO ICE SYMBOLS USED IN PLOTTING ICE FEATURES

TOTAL CONCENTRATION

□	Ice free
⁙	<1 okta* (open water)
▧	1-<3 oktas (very open pack)
▥	3-<6 oktas (open pack)
▨	6-<7 oktas (close pack)
▤	7-<8 oktas (very close pack)
⊠	8 oktas (compact pack)

```
CONC  = Concentration
CRK   = Crack
CRKS  = Cracks
FRCT  = Fracture
FRCTV = Very Small Fracture
FRCTS = Small Fracture
FRCTM = Medium Fracture
FRCTL = Large Fracture
LVL   = Level Ice
NDTR  = Not Determined
NOPG  = No Openings in Ice
WBF   = Water Between Floes
SCTD  = Scattered
SD    = Snow Depth
T     = Ice Thickness
```

COVERAGE BY SIZE

$$\frac{C}{n_1 n_2 n_3}$$

C = total concentration

n_1	SS/NL = New Ice or Nilas PK = Pancake <3 m CK = Brash, Small Cake, Cake <20 m
n_2	SF = Small Floe 20—100 m MF = Medium Floe 100—500 m
n_3	BF = Big Floe 500—2000 m VF = Vast Floe 2—10 km GF = Giant Floe >10 km Fast = Fast Ice

Example: $\frac{7}{124}$ PK

7 = total concentration
1 = okta all pancake ice
2 = oktas small and medium ice floes
4 = oktas big, vast, and giant ice floes

STAGE OF DEVELOPMENT

$$\frac{A}{\text{oktas predominant, oktas secondary}}$$

AGE		AVERAGE THICKNESS
SS = Frazil, Grease, Slush, Shuga		
NL = Ice Rind, Dark Nilas, Light Nilas	— —	<5—10 cm
G = Gray	— — — — — — —	10—15 cm
GW = Gray-White	— — — — — — —	15—30 cm
FL = Thin First-Year	— — — — — — —	30—70 cm
FM = Medium First-Year	— — — — — — —	70—120 cm
FT = Thick First-Year	— — — — — — —	>120 cm
SY = Second-Year		
MY = Multi-Year		

Example: $\frac{A}{5FM3G}$

A = Stage of development
5FM = 5 oktas Medium First-Year
3G = 3 oktas Gray

*One okta equals one-eighth ice concentration

TOPOGRAPHY

ΛΛ	Rafted or Finger-Rafted Ice
∩∩	Hummocks
ΛΛΛ(N)	New Ridges
ΛΛΛ(W)	Weathered Ridges
ΛΛΛ(V)	Very Weathered Ridges
ΛΛΛ(A)	Aged Ridges
ΛΛΛ(C)	Consolidated Ridges

Example: $\frac{\Lambda\Lambda\Lambda\ (N)\ (h)}{(n)}$

(h) height of ridges in meters
(n) tenths coverage on ice

STAGE OF MELTING

FPD = Few Puddles
MPD = Many Puddles
FTH = Few Thaw Holes
MTH = Many Thaw Holes
DRI = Dried Ice
ROT = Rotten Ice
FLO = Flooded Ice

UNDERCAST

〰〰 Limit

THICKNESS OF ICE & SNOW

t_E = ice thickness in cm
s = snow depth in cm

PHENOMENA

┼┼┼┼	crack
≈≈≈	fracture
⬭	polynya
≃	lead
△(n)	icebergs
⏢(n)	bergy bits & growlers

(n) = number in area

ICE EDGE

————	observed
— — —	radar
• • • • •	limit of observed data
•—•—•	satellite data

FIGURE 6

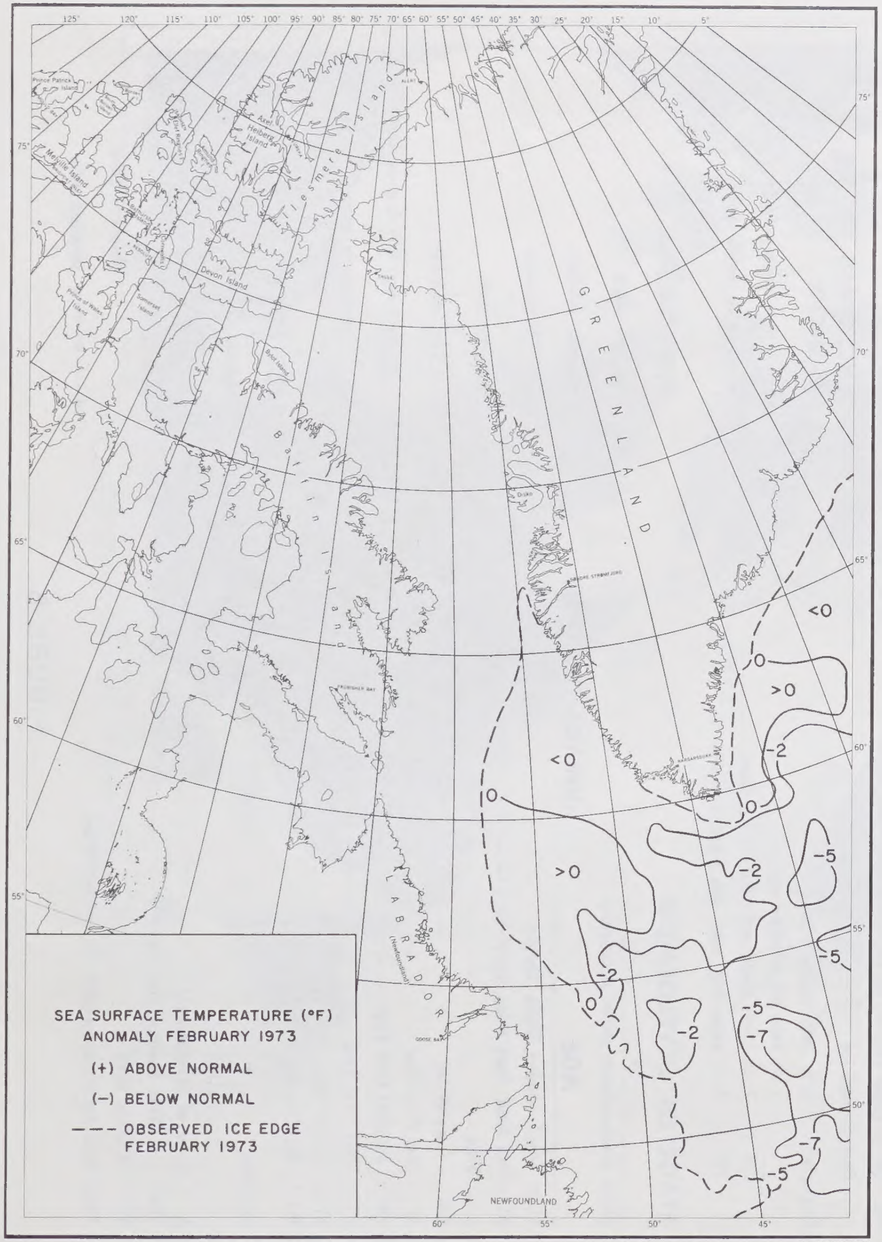


FIGURE 7

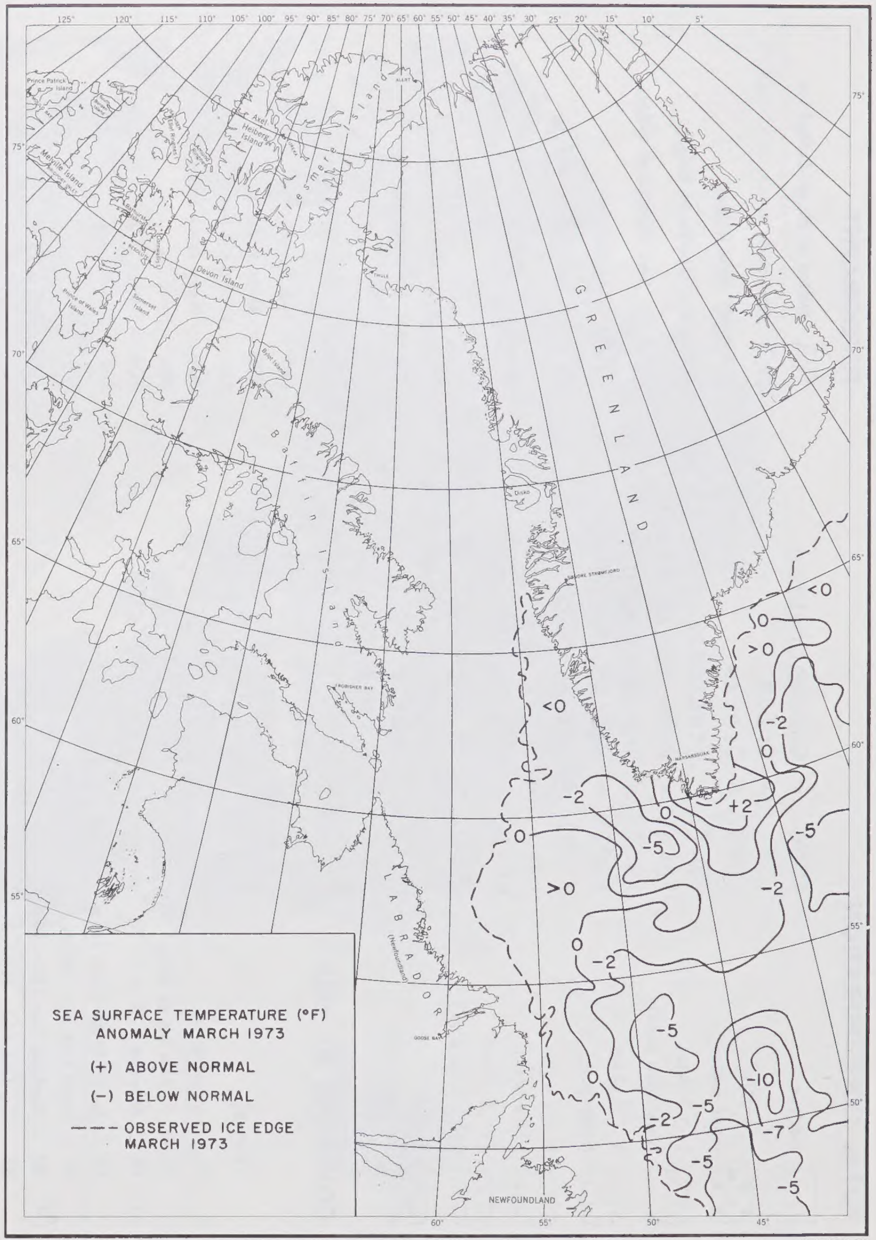
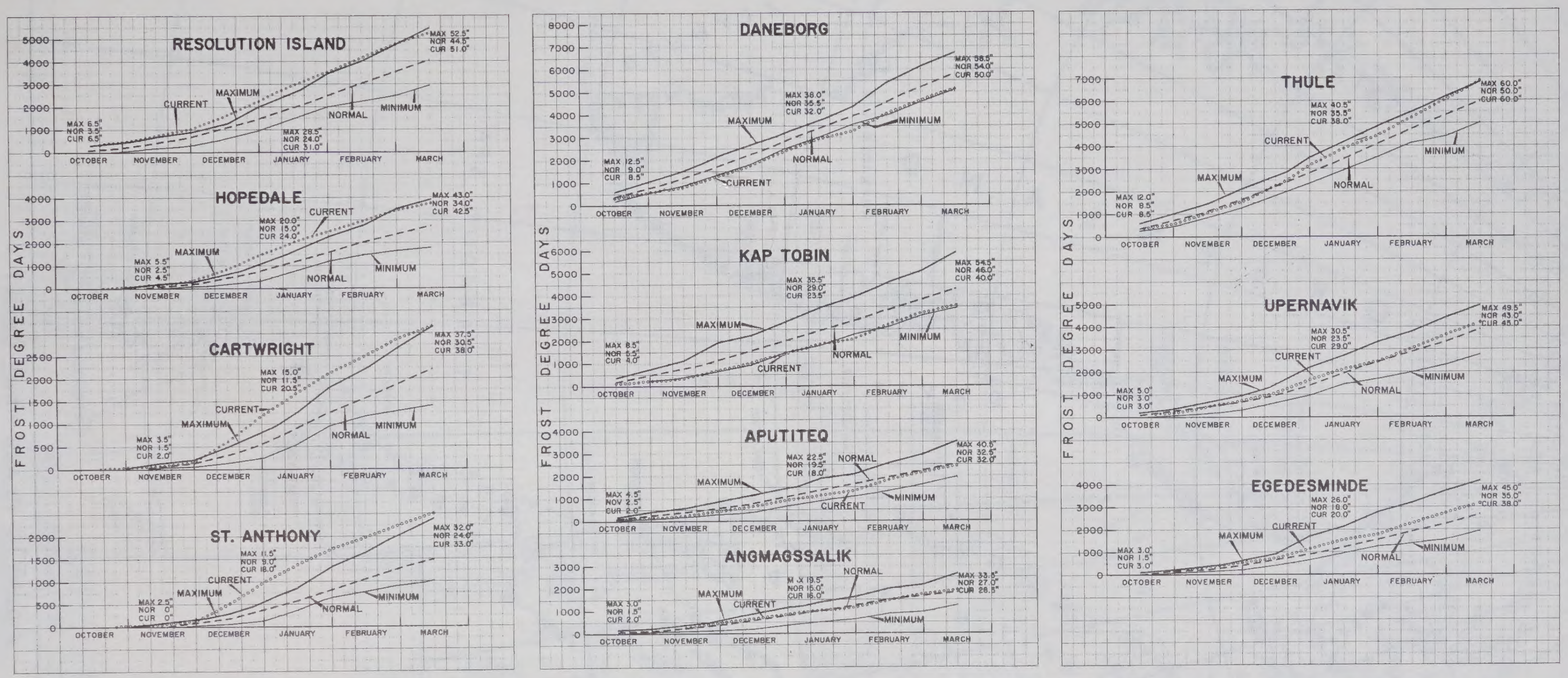


FIGURE 8



LEGEND

MAX "N" – HISTORICAL MAXIMUM ICE THICKNESS IN INCHES ON 15 OCTOBER, 1 JANUARY AND 15 MARCH

NOR "N" – HISTORICAL NORMAL ICE THICKNESS IN INCHES ON 15 OCTOBER, 1 JANUARY, AND 15 MARCH

CUR "N" – ICE THICKNESS IN INCHES ON 15 OCTOBER 1972, 1 JANUARY 1973, AND 15 MARCH 1973

FIGURE 9 FROST DEGREE DAY CURVES AND ICE THICKNESS VALUES FOR SELECTED TIME PERIODS

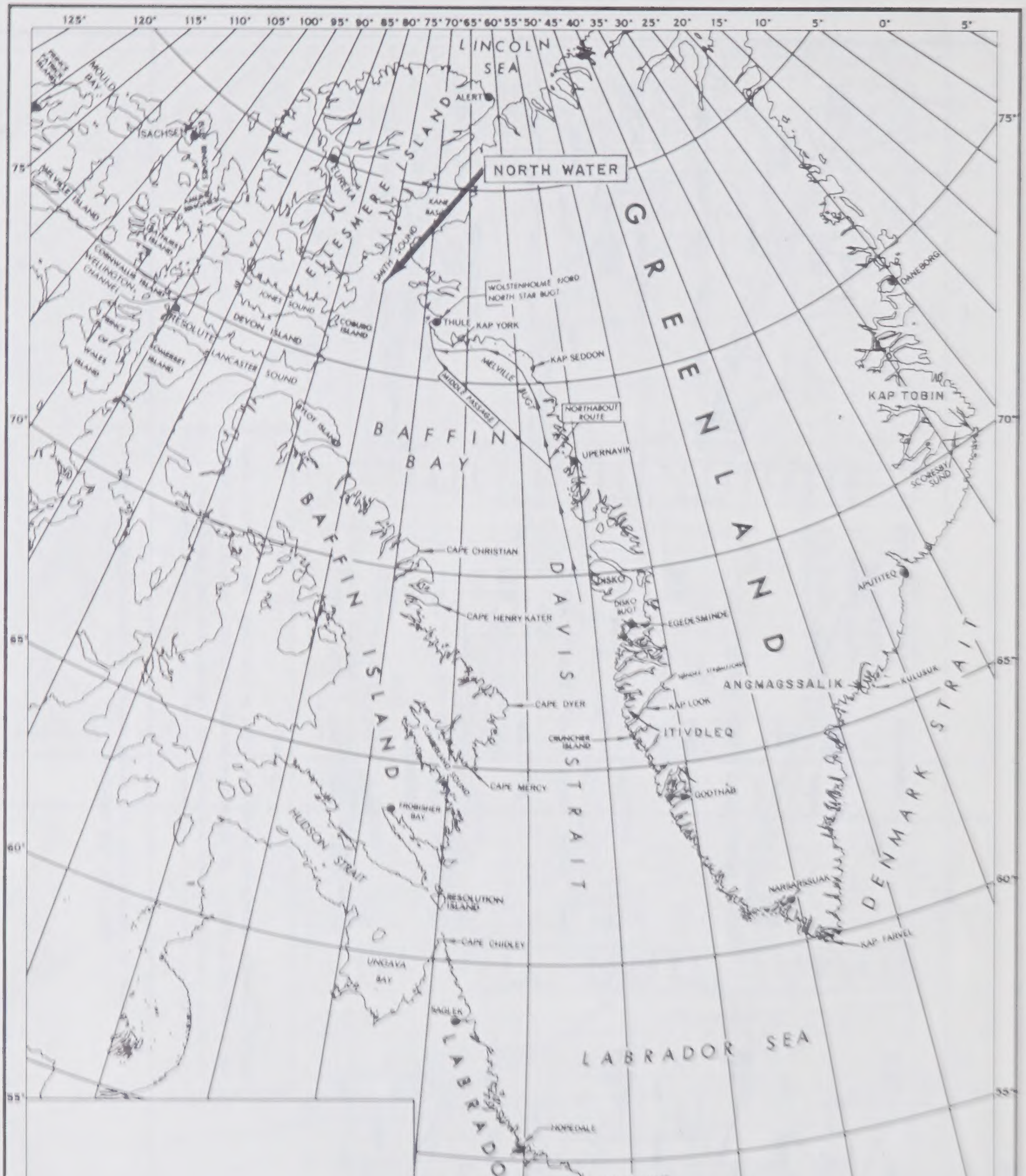


FIGURE 10 PLACE NAME CHART

EDITORIAL INFORMATION

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